

RESPONSE AND REQUEST FOR RECONSIDERATION

Support.

Support for the new lower level of the range (10-20% or 15-20%) is found on page 6. Applicants describe there an invention in which not more than 20 mole percent of the molecules have a certain low molecular weight, and other embodiments in which the limit is 10 or 15%. Applicants are now claiming a portion of the original range, that is 10-20% or 15-20%.

Response.

In the outstanding office action the Examiner has rejected the originally submitted claims as either anticipated by U.S. Patent 5,396,041, Diana et al. (claims 1-16, 25, 27, and 28) or as made obvious by a combination of Diana with U.S. Patent 5,053,152, Steckel (claims 17-24 and 26).

Diana discloses improved lubricating oil dispersants wherein a fractionating polymer is prepared prior to functionalization for making dispersant additives. The functionalization of the polymer can be carried out by, e.g., reacting the polymer with an unsaturated carboxylic acid producing compound. Less than about 10 mole % of the chains in the polymer should have a molecular weight of less than 500, and preferably less than about 5%, more preferably less than 3%. The functionalized polymers can be derivatized by reacting with diamines. The amine can be a heavy polyamine, containing essentially no tetraethylenepentamine and at most small amounts of pentaethylenehexamine.

The compositions of the present claims are distinguished from the materials disclosed in Diana for at least two reasons. First, the claims as amended specify that the amount of low molecular weight polymer chains is now defined as "10 to about 20 mole percent." This is plainly distinct from the "less than 10%" disclosed in Diana. There is no motivation to move from the "less than about 10%" in the prior art to "10 to about 20 mole percent." The 10% limit in Diana is an upper limit, and the preferred ranges are considerably lower, indicating that any higher values are particularly disfavored. There is no potential advantage disclosed in Diana for using compositions with any higher values, and indeed, Diana's advantages of improved dispersancy are suggested only at the lower values. Hence, the present claims are neither anticipated nor made obvious by the disclosure of Diana.

It is noted that new claim 29 specifies that 15 to about 20 mole percent of the substituent has a molecular weight of less than 500. This is even further removed from the disclosure of Diana, and the arguments presented above apply with even greater force.

Secondly, although certain elements of the claims are disclosed in Diana (although not the particular molecular weight limitation, described above), those disclosures are only piecemeal. There is no disclosure of a dispersant in which both the hydrocarbyl group is substantially free from the low molecular weight component and the amine moiety is substantially free from components containing fewer than 6 nitrogen atoms. The hydrocarbyl group description is found in column 7; the amine component is listed in column 24, and heavy polyamines are only one of numerous types of amines which are listed. In the Examples, the polymer employed was stripped to remove a light ester component. The materials actually used are thus esters, and not succinimide dispersants prepared from amines, as in the present invention. It is not proper to pick and choose components from within a reference to piece together a rejection under 35 U.S.C. 102.

The Steckel patent teaches condensed amines and their use in preparing acylating agents. Certain of the present claims specify the use of condensed amines of the type disclosed by Steckel. The Examiner believes that this type of amine is taught by Diana in column 24.

In fact, the hydroxyamines disclosed in Diana are different from both those of the present invention as well as the condensed amines of Steckel. Diana's hydroxyamines include such materials as "2-amino-1-butanol, 2-amino-2-methyl-1-propanol, ... N-(beta-hydroxypropyl)N'-(beta-amino-ethyl)-piperazine, ... beta-(beta-hydroxyethoxy)-ethylamine and the like." These materials contains at most 3 nitrogen atoms, not the 7 or more required by the present claims. Moreover, they are all relatively low molecular weight materials, in contrast to the high molecular weight condensation products generally disclosed by Steckel. Accordingly, there is no motivation to combine Steckel and Diana to arrive at the present invention.

The Examiner had also remarked about the similarity of claims 1 and 28 and questioned whether they in fact both cover the same thing. The difference is actually that in claim 1, in component (I) the hydrocarbyl substituent "is" a polymeric species, and the molecular weight of that hydrocarbyl substituent is defined. In claim 28, component (I), the hydrocarbyl substituent is "prepared from" a polymeric species of certain molecular weight characteristics. While the distinction is perhaps small, both alternative wordings are presented to assure adequate coverage regardless of whether the hydrocarbyl substituent in question was prepared directly from a polymeric species or may have been generated in some other manner. Applicants would be willing to consider deleting claim 28 upon an indication from the Examiner that there is no distinction between the extent of coverage of the claims using these wordings.

Conclusion.

For the foregoing reasons it is submitted that the present claims are in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (amended) A composition suitable for reducing engine sludge and degradation of elastomer seals comprising

a major amount of an oil of lubricating viscosity and

a minor amount of a nitrogen-containing dispersant wherein the nitrogen containing dispersant is a reaction product of

(I) a hydrocarbyl-substituted succinic acylating agent, wherein 10 to no more than about 20 mole percent of the individual molecules thereof have a hydrocarbyl substituent with a molecular weight of less than 500; wherein the hydrocarbyl substituent is a polymeric species consisting essentially of olefin monomer units of at least 3 carbon atoms; and

(II) at least one polyamine, wherein the polyamine is

(a) a polyalkylene amine containing at least one H-N< group; or

(b) a condensate of (i) a polyalkylene amine containing at least one H-N< group with (ii) at least one alcohol containing at least one ether group, amine group, nitro group, or additional alcohol group;

wherein in said polyamine (a) or condensed polyamine (b) no more than about 20 mole percent of the molecules contain 6 or fewer nitrogen atoms.

28. (amended) A composition suitable for reducing engine sludge and degradation of elastomer seals comprising

a major amount of an oil of lubricating viscosity and

a minor amount of a nitrogen-containing dispersant wherein the nitrogen containing dispersant is a reaction product of

(I) a hydrocarbyl-substituted succinic acylating agent wherein the hydrocarbyl substituent is prepared from a polymeric species consisting essentially of olefin monomer units of at least 3 carbon atoms and wherein 10 to no more than about 20 mole percent of the individual molecules of said polymeric species have a molecular weight of less than 500; and

(II) at least one polyamine, wherein the polyamine is

(a) a polyalkylene amine containing at least one H-N< group; or

(b) a condensate of (i) a polyalkylene amine containing at least one H-N< group with (ii) at least one alcohol containing at least one ether group, amine group, nitro group, or additional alcohol group;

wherein in said polyamine (a) or condensed polyamine (b) no more than about 20 mole percent of the molecules contain 6 or fewer nitrogen atoms.